Unusual MR Imagings of an Incidental Testicular Epidermoid Cyst: a case report

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Testicular epidermoid cyst is usually incidentally found during a physical check-up. It is an uncommon intratesticular benign tumor. Because testicular epidermoid cyst is usually encapsulated by a fibrous wall and filled with keratinous debris, it usually appears solid-like on sonographic and magnetic resonance (MR) imagings. Typically, testicular epidermoid cyst has a target appearance on MR imagings. Here we present a case of testicular epidermoid cyst, which was incidentally detected by ultrasound during an episode of acute epididymitis. This mass showed an unusual purely cystic structure with thick wall, which had low signal intensity wall on MR imagings. Benign testicular epidermoid cyst was suspected from the preoperative sonographic and MR study. Enucleation of the testicular mass was done and the final pathologic result was testicular epidermoid cyst. In our case, preoperative imaging findings provided information to the surgeons to attempt testis-sparing surgery instead of orchietomy.

Key words: Epidermoid cyst; Magnetic resonance (MR); Testis

Testicular epidermoid cysts are benign tumors. Typically, testicular epidermoid cysts have target-like appearance on MR imaging [1-6]. Here we report a case of testicular epidermoid cyst which was incidentally found by ultrasound. It didn’t show a typical target appearance but appeared as a purely cystic lesion with low signal intensity rim on MR images. Since benign testicular epidermoid cyst could not be excluded on preoperative imaging, local enucleation of the mass was done for the patient, followed by immediate pathological frozen sections study. Organ-sparing surgery offers better psychologic and cosmetic results, and also offers preservation of fertility [3, 4, 6, 7].

CASE REPORT

A 20-year-old male suffered from painful swelling of right hemiscrotum for 2 weeks. Physical examination revealed an enlarged right hemiscrotum with tenderness and the patient was referred for sonographic evaluation. Gray-scale sonography of the scrotum was performed using a 7-MHz high-resolution linear transducer (Model 128XP, Acuson, Mountain View, CA, USA). Ultrasound examination showed an enlarged right epididymis, and incidental finding of intratesticular ovoid shape hypoechoic mass with hyperechoic rim in the upper pole of the left testis (Fig. 1). Right acute epididymitis and left testicular tumor were impressed after ultrasound study. The patient was admitted and MRI (1.5 T, Vision Plus, Siemens, Erlangen, Germany, slice thickness: 5 mm, FOV 210 mm) of the scrotum was performed. The mass in left testis showed low signal intensity on T1-weighted images (Fig. 2a), high signal intensity with peripheral low signal intensity rim on T2-weighted images (Fig. 2b), and no enhancement on T1-weighted images after intravenous injection of gadolinium-DTPA (Fig. 2c). Benign testicular epidermoid cyst could not be excluded from MR images. Enlarged right epididymis showed heterogeneous signal intensity on both T1-
weighted and T2-weighted MR images (Fig. 2a, 2b). It also showed marked heterogeneous enhancement after intravenous injection of gadolinium-DTPA (Fig. 2c). The findings were compatible with right side acute epididymitis.

The patient underwent enucleation of the left testicular tumor after conservative treatment of right acute epididymitis. Operative finding showed a yellowish, intratesticular, encapsulated mass in upper pole of the left testis. The cut surface of this lesion revealed milky fluid and keratinous debris (Fig. 3). Microscopically (Fig. 4), the cystic lesion was composed of fibrous capsule, some calcified deposits in the inner surface of the fibrous capsule, and keratinous debris content. Pathologic diagnosis was epidermoid cyst with calcifications. The post-operative condition of this patient was uneventful.

**DISCUSSION**

Testicular epidermoid cysts account for approximately 1% of all testicular tumors [6, 8, 9] most commonly detected in the second to the fourth decades of life [3, 7, 8]. Testicular epidermoid cyst usually presents as a palpable, non-tender, and well-circumscribed intratesticular mass, and is found by self-examination or during a routine physical check-up [2, 4, 9]. Diffuse testicular enlargement is noticed in approximately 10% of cases [4, 9, 10]. Histologically, this benign tumor is lined with squamous epithelia in the inner surface of a fibrous wall and contains desquamated keratinized epithelia and keratinous debris [4, 6, 8, 11].

The histogenesis of testicular epidermoid cysts has not been completely proved, but most investigators suggest that it is monodermal development of teratoma [4, 6, 8] or squamous metaplasia of the seminiferous epithelium or rete testis [4]. Teratoma may have malignant potential and can metastasize [6, 11], but epidermoid cyst is a benign lesion, with no metastasis or local recurrence ever reported [6, 11, 12]. Differing from dermoid cysts and teratomas, epidermoid cysts do not have the contents of hair follicles, eccrine glands, sebaceous glands, bones, cartilages [7, 8].

Testicular epidermoid cyst may has fibrous capsule with complete or incomplete inner lining of squamous epithelium, or only squamous epithelium without fibrous capsule [3, 4]. The former shows echogenic rim on ultrasound images, and the latter does not have echogenic rim. Sometimes the echogenic rim may represent calcifications [4]. Calcifications may occur in the fibrous capsule of testicular epidermoid cyst or within the mass itself [4].

At pathologic correlation in our case, the fibrous capsule and few calcifications on the inner surface give rise to the echogenic rim of the lesion.

Internal echogenicity of testicular epidermoid cysts may show different appearance on ultrasound study [4]: (a) onion-skin or target appearance, (b) laminated appearance, (c) heterogeneous appearance. It depends on alternating patterns of the compacted keratin and loosely dispersed desquamated squamous cells [3, 11, 13]. In our case, the lesion showed heterogeneous appearance on sonographic images, representing randomly-arranged keratins with no or few alternating patterns.

Rare MR findings of testicular epidermoid cysts have been described [1-5, 14, 15]. MR imaging of testicular epidermoid cysts may show different patterns: (a) alternating concentric ring of low and high signal intensity on T1- and T2-weighted images (target appearance) [1-4], (b) heterogeneous signal intensity on both T1- and T2-weighted images (mixed low, intermediate and high signal intensity) [4], (c) low signal intensity on T1 and high signal intensity on T2-weighted images (cystic appearance) [3, 15]. All the patterns show low signal intensity rim on T2-weighted MR imaging. The typical appearance is the first pattern, also called target appearance [1-4, 6]. Brenner et al. [1] postulated that the outer fibrous capsule, epithelial lining, and adjacent compact keratin
produced peripheral low signal intensity, the dense debris and calcification produced central low signal intensity, and the desquamated cellular debris containing both high water content and high lipid content produced central zone of high signal intensity.

The testicular epidermoid cyst in our case had unusual cystic appearance on MR imagings. Most testicular epidermoid cysts appear solid-like (target or heterogeneous) on MR imagings due to their keratinous debris content. To our knowledge, only three cases [3, 15] of testicular epidermoid cyst with purely cystic appearance on the MR imagings had been reported, and only one case [3] among them had pathologic correlation. Interestingly, on pathologic examinations, that case and our case shared similar finding of keratinous debris filling in the lumen. In our case, the pathologic findings of intermixed randomly arranged keratinous debris and milky fluid may be the reason of the cystic appearance on the MR imaging. Keratinous debris mixed with water would not show low signal intensity on T2-weighted images. In our case, the low signal intensity on T1-weighted images may be due to lack of lipid content or only minimal lipid content which cannot be detected on MR images.

MR images of testicular epidermoid cysts show either solid-like appearance or cystic appearance, and
the differential diagnoses are other benign or malignant testicular tumors. On MR imaging, testicular tumors usually demonstrate signal intensity similar to that of normal testicular tissue on T1-weighted image and lower signal intensity than that of normal testicular tissue on T2-weighted image [3]. If a testicular tumor has areas of necrosis, cyst formation, hemorrhage, or calcification, it may mimic epidermoid cyst. However, if a testicular mass shows irregular border or an intratesticular cystic lesion has solid components, malignancy should be considered [6]. Doppler sonography and contrast-enhanced MR are helpful to evaluate the vascularity. Testicular epidermoid cysts typically show no color flow signal on Doppler sonography and no enhancement on contrast-enhanced MR [3, 4, 13, 14].

Epidermoid cysts can be cured by orchietomy or enucleation of the lesion [4, 7, 11]. Organ-preserving surgery may offer better psychologic and cosmetic results, and also the preservation of fertility. If the preoperative imaging of a testicular lesion shows the possibility of epidermoid cyst, organ-preserving enucleation surgery with immediate pathological frozen section may be carried out more often [3, 4, 6, 7].

In conclusion, testicular epidermoid cyst is an uncommon benign testicular tumor. The ultrasound and MR imaging may help us to diagnose this benign tumor preoperatively.

**REFERENCE**


偶發睾丸表皮樣囊腫少見的磁振造影影像：病例報告

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睾丸表皮様囊腫通常由身體檢查時意外發現，是一種不常見的睾丸內良性腫瘤。睾丸表皮様囊腫通常由一個纖維外膜覆蓋，裡面則充滿了角質碎屑，所以它常在超音波和磁振造影表現上是似固態實質的型態。睾丸表皮様囊腫的磁振造影影像典型表現是靶樣型態。本文有一病例發生右側的急性副睾炎，於做超音波檢查時，意外發現左側睾丸有一個腫塊。這個腫塊在磁振造影影像上呈現少見的純粹水囊狀型態，具有較厚和低訊號的壁。這個腫塊在術前超音波和磁振造影上無法排除良性表皮様囊腫。這個病人接受腫瘤摘除術，病理報告是表皮樣囊腫。術前正確的超音波和磁振造影診斷，可以提供外科醫師以腫瘤摘除術取代睾丸切除術。

關鍵詞：表皮様囊腫；磁振造影；睾丸